

WHAT IS CLAIMED IS:

1. A method of generating key information, comprising the steps of:
- 5 rearranging bits of a first bit sequence in a first matrix according to a predetermined arrangement rule, the first bit sequence representing information being a base of a key;
- forming blocks in the first matrix, wherein each of the blocks has bits, the number of which is smaller than the number of bits
- 10 composing the first matrix;
- executing logical operation among bits in each of the blocks and generating a bit being a result of the logical operation;
- combining the logical-operation-result bits into a second bit sequence, wherein the number of bits composing the second bit
- 15 sequence is smaller than the number of bits composing the first bit sequence; and
- accessing a second matrix composed of predetermined third bit sequences and reading out one from among the third bit sequences in response to the second bit sequence, and outputting
- 20 the read-out third bit sequence as information representative of the key, wherein the number of bits composing each of the third bit sequences is smaller than the number of bits composing the second bit sequence.
- 25 2. An apparatus for generating key information, comprising:  
means for rearranging bits of a first bit sequence in a first

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matrix according to a predetermined arrangement rule, the first bit sequence representing information being a base of a key;

means for forming blocks in the first matrix, wherein each of the blocks has bits, the number of which is smaller than the number of bits composing the first matrix;

means for executing logical operation among bits in each of the blocks and generating a bit being a result of the logical operation;

means for combining the logical-operation-result bits into a second bit sequence, wherein the number of bits composing the second bit sequence is smaller than the number of bits composing the first bit sequence; and

means for accessing a second matrix composed of predetermined third bit sequences and reading out one from among the third bit sequences in response to the second bit sequence, and outputting the read-out third bit sequence as information representative of the key, wherein the number of bits composing each of the third bit sequences is smaller than the number of bits composing the second bit sequence.

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3. A method of encrypting contents information, comprising the steps of:

generating a signal representative of a key from information being a base of the key, the key base information including a first bit sequence; and

encrypting contents information in response to the key signal;

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wherein the generating step comprises:

1) rearranging bits of the first bit sequence in a first matrix according to a predetermined arrangement rule;

2) forming blocks in the first matrix, wherein each of the  
5 blocks has bits, the number of which is smaller than the number of bits composing the first matrix;

3) executing logical operation among bits in each of the blocks and generating a bit being a result of the logical operation;

4) combining the logical-operation-result bits into a second bit  
10 sequence, wherein the number of bits composing the second bit sequence is smaller than the number of bits composing the first bit sequence; and

5) accessing a second matrix composed of predetermined third bit sequences and reading out one from among the third bit  
15 sequences in response to the second bit sequence, and outputting the read-out third bit sequence as the key signal, wherein the number of bits composing each of the third bit sequences is smaller than the number of bits composing the second bit sequence.

20 4. An apparatus for encrypting contents information, comprising:  
means for generating a signal representative of a key from information being a base of the key, the key base information including a first bit sequence; and

means for encrypting contents information in response to the  
25 key signal;

wherein the generating means comprises:

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1) means for rearranging bits of the first bit sequence in a first matrix according to a predetermined arrangement rule;

2) means for forming blocks in the first matrix, wherein each of the blocks has bits, the number of which is smaller than the  
5 number of bits composing the first matrix;

3) means for executing logical operation among bits in each of the blocks and generating a bit being a result of the logical operation;

4) means for combining the logical-operation-result bits into a  
10 second bit sequence, wherein the number of bits composing the second bit sequence is smaller than the number of bits composing the first bit sequence; and

5) means for accessing a second matrix composed of predetermined third bit sequences and reading out one from among  
15 the third bit sequences in response to the second bit sequence, and outputting the read-out third bit sequence as the key signal, wherein the number of bits composing each of the third bit sequences is smaller than the number of bits composing the second bit sequence.

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5. A method of decrypting contents information, comprising the steps of:

generating a signal representative of a key from information being a base of the key, the key base information including a first bit  
25 sequence; and

decrypting encryption-resultant contents information in

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response to the key signal;

wherein the generating step comprises:

1) rearranging bits of the first bit sequence in a first matrix according to a predetermined arrangement rule;

5           2) forming blocks in the first matrix, wherein each of the blocks has bits, the number of which is smaller than the number of bits composing the first matrix;

3) executing logical operation among bits in each of the blocks and generating a bit being a result of the logical operation;

10           4) combining the logical-operation-result bits into a second bit sequence, wherein the number of bits composing the second bit sequence is smaller than the number of bits composing the first bit sequence; and

5) accessing a second matrix composed of predetermined  
15 third bit sequences and reading out one from among the third bit sequences in response to the second bit sequence, and outputting the read-out third bit sequence as the key signal, wherein the number of bits composing each of the third bit sequences is smaller than the number of bits composing the second bit sequence.

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6. An apparatus for decrypting contents information, comprising:  
means for generating a signal representative of a key from information being a base of the key, the key base information including a first bit sequence; and

25           means for decrypting encryption-resultant contents information in response to the key signal;

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wherein the generating means comprises:

1) means for rearranging bits of the first bit sequence in a first matrix according to a predetermined arrangement rule;

2) means for forming blocks in the first matrix, wherein each  
5 of the blocks has bits, the number of which is smaller than the number of bits composing the first matrix;

3) means for executing logical operation among bits in each of the blocks and generating a bit being a result of the logical operation;

10 4) means for combining the logical-operation-result bits into a second bit sequence, wherein the number of bits composing the second bit sequence is smaller than the number of bits composing the first bit sequence; and

5) means for accessing a second matrix composed of  
15 predetermined third bit sequences and reading out one from among the third bit sequences in response to the second bit sequence, and outputting the read-out third bit sequence as the key signal, wherein the number of bits composing each of the third bit sequences is smaller than the number of bits composing the second  
20 bit sequence.

7. A recording medium storing encryption-resultant key base information and encryption-resultant contents information generated by the method in claim 3.

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8. A method of transmitting contents information, comprising

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the steps of transmitting encryption-resultant key base information through a transmission line, and transmitting encryption-resultant contents information through the transmission line, the encryption-resultant contents information being generated by the method in  
5 claim 3.

9. A method of generating key information, comprising the steps of:

dividing a first bit sequence into second bit sequences, the  
10 first bit sequence being contained in information being a base of a key, wherein the number of bits composing each of the second bit sequences is smaller than the number of bits composing the first bit sequence;

sequentially accessing a first matrix composed of  
15 predetermined data pieces and sequentially reading out ones from among the predetermined data pieces in response to the second bit sequences;

combining the read-out data pieces into a third bit sequence, wherein the number of bits composing the third bit sequence is  
20 smaller than the number of bits composing the first bit sequence;

rearranging bits of at least part of the third bit sequence in a second matrix according to a predetermined arrangement rule;

forming blocks in the second matrix, wherein each of the blocks has bits, the number of which is smaller than the number of  
25 bits composing the second matrix;

executing logical operation among bits in each of the blocks

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and generating a bit being a result of the logical operation; and

combining the logical-operation-result bits into a fourth bit sequence, and outputting the fourth bit sequence as at least part of information representative of the key, wherein the number of bits  
5 composing the fourth bit sequence is smaller than the number of bits composing the second matrix.

10. An apparatus for generating key information, comprising:

means for dividing a first bit sequence into second bit  
10 sequences, the first bit sequence being contained in information being a base of a key, wherein the number of bits composing each of the second bit sequences is smaller than the number of bits composing the first bit sequence;

means for sequentially accessing a first matrix composed of  
15 predetermined data pieces and sequentially reading out ones from among the predetermined data pieces in response to the second bit sequences;

means for combining the read-out data pieces into a third bit sequence, wherein the number of bits composing the third bit  
20 sequence is smaller than the number of bits composing the first bit sequence;

means for rearranging bits of at least part of the third bit sequence in a second matrix according to a predetermined arrangement rule;

25 means for forming blocks in the second matrix, wherein each of the blocks has bits, the number of which is smaller than the

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number of bits composing the second matrix;

means for executing logical operation among bits in each of the blocks and generating a bit being a result of the logical operation; and

5 means for combining the logical-operation-result bits into a fourth bit sequence, and outputting the fourth bit sequence as at least part of information representative of the key, wherein the number of bits composing the fourth bit sequence is smaller than the number of bits composing the second matrix.

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11. A method of encrypting contents information, comprising the steps of:

generating a signal representative of a key from information being a base of the key, the key base information including a first bit  
15 sequence; and

encrypting contents information in response to the key signal; wherein the generating step comprises:

1) dividing the first bit sequence into second bit sequences, wherein the number of bits composing each of the second bit  
20 sequences is smaller than the number of bits composing the first bit sequence;

2) sequentially accessing a first matrix composed of predetermined data pieces and sequentially reading out ones from among the predetermined data pieces in response to the second bit  
25 sequences;

3) combining the read-out data pieces into a third bit

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sequence, wherein the number of bits composing the third bit sequence is smaller than the number of bits composing the first bit sequence;

4) rearranging bits of at least part of the third bit sequence in  
5 a second matrix according to a predetermined arrangement rule;

5) forming blocks in the second matrix, wherein each of the blocks has bits, the number of which is smaller than the number of bits composing the second matrix;

6) executing logical operation among bits in each of the blocks  
10 and generating a bit being a result of the logical operation; and

7) combining the logical-operation-result bits into a fourth bit sequence, and outputting the fourth bit sequence as at least part of the key signal.

15 12. An apparatus for encrypting contents information, comprising:  
means for generating a signal representative of a key from information being a base of the key, the key base information including a first bit sequence; and

means for encrypting contents information in response to the  
20 key signal;

wherein the generating means comprises:

1) means for dividing the first bit sequence into second bit sequences, wherein the number of bits composing each of the second bit sequences is smaller than the number of bits composing  
25 the first bit sequence;

2) means for sequentially accessing a first matrix composed of

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predetermined data pieces and sequentially reading out ones from among the predetermined data pieces in response to the second bit sequences;

3) means for combining the read-out data pieces into a third  
5 bit sequence, wherein the number of bits composing the third bit sequence is smaller than the number of bits composing the first bit sequence;

4) means for rearranging bits of at least part of the third bit sequence in a second matrix according to a predetermined  
10 arrangement rule;

5) means for forming blocks in the second matrix, wherein each of the blocks has bits, the number of which is smaller than the number of bits composing the second matrix;

6) means for executing logical operation among bits in each of  
15 the blocks and generating a bit being a result of the logical operation; and

7) means for combining the logical-operation-result bits into a fourth bit sequence, and outputting the fourth bit sequence as at least part of the key signal.

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13. A method of decrypting contents information, comprising the steps of:

generating a signal representative of a key from information being a base of the key, the key base information including a first bit  
25 sequence; and

decrypting encryption-resultant contents information in

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response to the key signal;

wherein the generating step comprises:

1) dividing the first bit sequence into second bit sequences,  
wherein the number of bits composing each of the second bit  
5 sequences is smaller than the number of bits composing the first bit  
sequence;

2) sequentially accessing a first matrix composed of  
predetermined data pieces and sequentially reading out ones from  
among the predetermined data pieces in response to the second bit  
10 sequences;

3) combining the read-out data pieces into a third bit  
sequence, wherein the number of bits composing the third bit  
sequence is smaller than the number of bits composing the first bit  
sequence;

15 4) rearranging bits of at least part of the third bit sequence in  
a second matrix according to a predetermined arrangement rule;

5) forming blocks in the second matrix, wherein each of the  
blocks has bits, the number of which is smaller than the number of  
bits composing the second matrix;

20 6) executing logical operation among bits in each of the blocks  
and generating a bit being a result of the logical operation; and

7) combining the logical-operation-result bits into a fourth bit  
sequence, and outputting the fourth bit sequence as at least part of  
the key signal.

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14. An apparatus for decrypting contents information, comprising:

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means for generating a signal representative of a key from information being a base of the key, the key base information including a first bit sequence; and

means for decrypting encryption-resultant contents  
5 information in response to the key signal;

wherein the generating means comprises:

1) means for dividing the first bit sequence into second bit sequences, wherein the number of bits composing each of the second bit sequences is smaller than the number of bits composing  
10 the first bit sequence;

2) means for sequentially accessing a first matrix composed of predetermined data pieces and sequentially reading out ones from among the predetermined data pieces in response to the second bit sequences;

15 3) means for combining the read-out data pieces into a third bit sequence, wherein the number of bits composing the third bit sequence is smaller than the number of bits composing the first bit sequence;

20 4) means for rearranging bits of at least part of the third bit sequence in a second matrix according to a predetermined arrangement rule;

5) means for forming blocks in the second matrix, wherein each of the blocks has bits, the number of which is smaller than the number of bits composing the second matrix;

25 6) means for executing logical operation among bits in each of the blocks and generating a bit being a result of the logical

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operation; and

7) means for combining the logical-operation-result bits into a fourth bit sequence, and outputting the fourth bit sequence as at least part of the key signal.

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15. A recording medium storing encryption-resultant key base information and encryption-resultant contents information generated by the method in claim 11.

- 10 16. A method of transmitting contents information, comprising the steps of transmitting encryption-resultant key base information through a transmission line, and transmitting encryption-resultant contents information through the transmission line, the encryption-resultant contents information being generated by the method in
- 15 claim 11.

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